



5.0 CHAPTER E PROPOSED INSTRUCTIONS FOR A PLAN FOR PRESERVATION AND PREVENTION OF HARM TO THE APPLICATION TO THE ENVIRONMENT

5.1 General

This section outlines Noble Energy's Environmental management practices, followed by a review of the mitigation and abatement actions to be implemented and followed to reduce potential impacts on the environment during the Leviathan Field Development Project execution, production, and decommissioning activities.

Noble is responsible for ensuring that Project commitments, including those within this EIA, are implemented and that the Project's performance complies with applicable environmental, legal, regulatory, and corporate requirements.

The environmental management practices comprises mainly of a set of generic requirements for Contractors and future Leviathan Operations to adhere to.

This Chapter outlines those environmental practices of Noble Energy, and reviews the mitigation and preventative measures, actions, and procedures to be implemented and followed in order to reduce impacts on the environment during subsea infrastructure installation and operations of the Leviathan Development Production facilities.

5.1.1 Noble Environmental, Health, and Safety Management

Environmental, health, and safety management of Noble Energy activities is implemented through a hierarchy of policies, plans, and procedures that cascade from the corporate level to the business units and their individual operations. Based upon these high level policies, Noble Energy Israel is developing an Operations Management System (OMS) that provides specific procedures and guidelines for implementing its EHS systems.

The OMS provides a framework for establishing performance goals and incorporates Noble Energy's legal requirements and best practices into an umbrella framework within a model that integrates elements from both Safety and Health Management Systems and Environmental Management Systems. The OMS provides the framework for implementing a program designed to make offshore gas development safe for workers and protective of the environment.

The OMS will be implemented across offshore operations and is applied to third-party contractors involved in drilling and other support activities. This ensures that all levels of operations are performed in a consistent manner such that safety and environmental protection are consistently achieved. The integration of the Noble Energy OMS and contractor operations will be implemented through bridging documents that identify common processes and approaches to address any differences in procedures between Noble Energy and the contractor as well as any site-specific hazards of the Leviathan Field drilling and completion activities. Noble Energy will conduct an extensive comparison and review of vessel plans, processes, and procedures relative to the Noble Energy OMS to ensure that



the contractor's plans are acceptable for use as the primary system during the Leviathan Field drilling and completion activities.

5.2 Instructions

The following sections summarize actions that must be taken with the entire area of the Application through the lifecycle of the Project.

5.2.1 Instructions for the Various Stages of Performance of the Application

As mentioned in Section 5.1, the performance stages applicable to the scope of this Production EIA include execution, production and decommissioning.

Noble Energy takes a risk based approach that analyses safety and environmental hazards and establishes procedures, work practices, training programs and equipment requirements, including monitoring and maintenance rules. Risk assessment and mitigation measures will be extended to requirements for its contractors and subcontractors who provide services and material for the Project execution, production and decommissioning activities.

All execution, operation and decommissioning activities will be conducted in compliance with a series of operational procedures and instructions and employing Best Industry Practice procedures.

Trainings of employees and contractors to be cognizant of company and industry practices to prevent major incidents.

All vessel engines, generators and other emission sources associated with the Leviathan field development will be operated and maintained in accordance with manufacturers' recommendations and local regulation to avoid excessive emissions.

Navigational lighting onboard all vessels associated with the Leviathan development will meet SOLAS requirements as per IMO Resolution MSC. 253 (83), or equivalent requirements. Where present, helicopter flight decks shall use perimeter lighting in accordance with international standards.

During subsequent engineering phases of the Project, Noble Energy will conduct a number of studies to ensure that all aspects of the Leviathan Development (including wells and drilling, subsea facilities, fixed structures, and export pipeline design) meet applicable Project performance standards. Key activities to be conducted in the early design phases will include:

- Environmental Permits and Consents Planning;
- Development of Environmental Basis of Design;
- Emission and discharge identification, quantification, and reduction; and
- Best Available Technique (BAT) Assessments.

Noble will ensure that Contractors manage their activities in a manner that is consistent and in compliance with Noble Global Management System standards and expectations, Israeli national regulations and the requirements of International Conventions to which Israel is a signatory.



Noble will ensure that contractors selected to support the Leviathan Development maintain effective Environmental Management Systems that are in alignment with Noble expectations.

Companies invited to tender for construction / installation and commissioning contracts will be provided with Noble environmental expectations and standards. Contractor's environmental capabilities will form a part of the tender evaluation and award process, and bidders will be required to present detailed proposals for establishing and operating a compliant Environmental Management System throughout the duration of their contracts.

5.2.2 Handling of Hazardous Materials

Hazardous Materials (Liquid and chemicals)

Handling of hazardous material is likely during construction and installation of the Leviathan Production Development, however during operations, with this portion of the project being entirely subsea, hazardous materials requirements are not expected except at the LLP, which will be developing its own Environmental Management and Monitoring Plan in line with Israeli requirements and as such is considered outside the scope of this EIA. This section therefore references activities related to construction and installation hazardous waste management and handling and includes:

- Hazardous materials will be handled in accordance with their Material Safety Data Sheet (MSDS) specified guidelines, as integrated into the operator's guidelines for handling hazardous materials. All hazardous materials will be properly identified, stored, and handled, per MSDS requirements and in such a manner that secures no spill/discharge to sea. In addition, hazardous materials will be handled with MSDS-based exposure limits.
- Hazardous materials storage areas will be designated on the pipelay and support vessels will be located in areas isolated from other operations. Those storage areas will be maintained in clean condition with no residues or spilled materials on the container, floor, or surrounding area.
- Hazardous waste streams will be segregated by type and properties or relevant requirements, and will not be mixed together or managed in the same container with non-hazardous wastes.
- Separate storage locations or sufficient space/barriers will be provided to enable the segregation of incompatible chemicals.
- All hazardous and non-hazardous waste materials will be stored properly in containers that are non-leaking and compatible with the waste being stored. All containers will have their lids, rings, covers, bungs, and other means of closure properly installed at all times except when waste is being added or removed.
- Hazardous wastes will be handled and labelled in compliance with Israel specific MoEP hazardous waste handling guidelines, and guidelines as detailed in the drilling rig environmental management procedures.
- Firefighting Equipment will be available on board.



Solid Waste (Hazardous and Non-hazardous)

Generation of solid waste is likely during construction and installation of the Leviathan Production Development, and not in its operations as this portion of the project is entirely subsea (including the pipeline tie-in from the SSIV to the bottom of the LLP riser, hence there will be no requirement for use of solid waste management except at the LLP, which will develop its own Environmental Management and Monitoring Plan in line with Israeli requirements (and is considered outside the scope of this EIA). This section therefore reference activities related to construction and installation solid waste management and handling. The Project will include the following:

- An Integrated Waste Management Plan (WMP) will refer to vessel-specific WMPs, which will include provisions for segregating waste on-board, having secure areas for the storage of hazardous waste and recycling / reuse where practicable;
- Offshore waste during both construction and operation will be managed in accordance with the requirements of MARPOL 73 / 78. Project vessels will carry a WMP, specific to the Leviathan Field Development Project which will include written procedures for collection, storage, processing and disposal of waste, including the use of any relevant equipment fitted on-board. The WMP will also designate the persons responsible for carrying out the Plan;
- For the purposes of complying with MARPOL 73 / 78, construction waste arising on-board the vessels will be managed as MARPOL Annex V waste, with discharge at sea strictly prohibited;
- All waste (predominantly welding and packaging waste) will be retained on-board, source separated where practicable and collected by the port authorities or their nominated contractors using the existing port waste reception facilities;
- Any hazardous waste generated during offshore construction (other than MARPOL Annex I Oily Waste, described separately below) will be stored, collected and managed separately in accordance with Israeli regulations;
- Where waste is to be transported to shore for disposal the general approach will be to use licensed facilities which comply with national regulations.
- Prior to the start of construction and installation, contracts will be arranged with licensed organizations for the transport, reuse, recycling, treatment, and final disposal of waste, as necessary. However, it should be noted that no decision has been made as to which waste facilities in Israel will be used. This will be subject to further investigation during the detailed design phase;
- Consignment notes detailing the quantity and type of waste transferred between ships will be kept;
- Monitoring records will be maintained which will include as a minimum, the following information:
 - Types and quantities of waste generated;
 - Types and quantities of waste leaving Project sites or vessels for recycling, recovery or disposal;



- Details of vehicles or vessels transporting waste;
- Location of treatment or disposal facilities to which the waste is transported; and,
- Records of any spillages or unplanned releases or any enforcement actions.
- The majority of construction, installation and commissioning wastes will be transferred to vessel waste reception facilities for disposal at a suitable waste facility. Where appropriate equipment is available on board the vessel, selected wastes may be incinerated on-board in accordance with the IMO MEP 66 / 21 “Standard Specification for Shipboard Incinerators”. These operations will be performed such that they comply with the requirements of Regulation 16 of MARPOL Annex VI and the Standard Specification for On-board Ship Incinerators, adopted by the Marine Environment Protection Committee whereby a permit must be sought prior to use.

5.2.3 Reduction and Prevention of Harm to the Seafloor, Seawater and the Coastline

Upon installation and commissioning of the subsea infrastructure related to the Leviathan Development it is not anticipated that any operational activities will cause harm to the seafloor. Pigging of the pipeline may be necessary however pipeline fluids will be swept to the LLP and discharge from this operation is considered outside the scope of this EIA.

Therefore following instructions have been identified for pipeline and subsea infrastructure installation to reduce and prevent harm to the seafloor, seawater and coastline. It also includes consideration of harm to marine ecology, heritage and cultural sites, fishing and fish farming as a result of the impact assessment conducted in Chapter D which considered all such aspects.

- For Leviathan subsea equipment, hydrotest water is expected to comprise of seawater, treated with scale and corrosion inhibitors, oxygen scavengers, and biocide. These additives will be selected in accordance with their toxicity rating, and in accordance with accepted hazard assessments and where practicable favoring the lowest toxicity rated product. The proposed chemicals are “Gold” rated under the Offshore Chemical Notification Scheme (OCNS) and will therefore present a low hazard to the environment;
- The use of MEG (for hydrate inhibition) has a low risk of eco-toxic effect as it has a low toxicity and biodegrades readily in the marine environment. It also has low potential for bioaccumulation;
- Hydrotest fluids and MEG discharges will be directed upwards in order for it to be more readily assimilated into the water column;
- A Hydrotest Water Disposal Plan will be developed by Noble Energy that will include the regulatory expectations and will describe the mitigation measures to be adopted to ensure environmental risks from hydrotest water disposal are minimized;
- All hydrotest discharges will be subject to discharge permit approval;
- Water-soluble low-toxicity hydraulic fluids, according to OCNS, will be selected for the infield control systems and umbilical test and storage fluids. DREAM modeling has been employed to confirm that it poses little or no threat to the marine environment;



- Noble Energy will implement management measures to minimize the risk of invasive marine species introduction through ballast water in accordance with IMO regulations;
- All activities will be in accordance with MARPOL 73 / 78, including:
 - Annex I (Oil);
 - Annex V (Garbage) which implements the changes made to Annex V (Garbage) by the IMO, since 1998 up to the 2008 Regulations being signed; and,
- All vessels associated with subsea facility installation that will discharge sewage, and drainage to sea shall ensure that all discharges take place more than 12 nm from shore if it is untreated. Where practicable sewage will be treated onboard and food wastes will be macerated prior to discharge. Sewage that is treated with a MARPOL 73 / 78 approved shipboard sewage treatment plant is permitted to be discharged within the 12 nm territorial limit providing it is at a distance of more than 3 nm from the coastline. The rate of sewage discharged will be approved by the Administration.
- Deck drainage from machinery space bilges will pass through an oil-water separator prior to discharge, or in some circumstances, oil and oily mixtures may be retained onboard for discharge to port reception facilities (See MARPOL Annex I, Regulation 14).
- Additional, all construction and installation vessels will maintain a Marine Sanitary Device in operating conditions.
- All discharges to sea will be according to discharge requirements;
- In the event of a spill the response and remediation strategy would take into account high priority socio-economic facilities according to the Israel Sensitivity Analysis such as power stations, public beaches and the fishing and marine farming areas and high priority ecological environments such as sea turtle habitats and natural preserves;;
- An EBS was conducted along the proposed pipeline route and the area to be occupied by subsea facilities to ensure that there are no sensitive species or habitats present (refer to EBS July & March, 2016).
- Geophysical hazard surveys have been undertaken and data collected regarding geological conditions, seafloor and shallow hazards, sediments, existing pipelines and cables and bathymetry information;
- DP construction, pipe lay and support vessels will be used for infrastructure installation activities which removes the requirement for anchoring and the associated impact to the seabed and benthic communities;
- Subsea facility requirements are optimized to minimize the footprint, for example the use of one six (6)m suction pile to secure the gathering manifold as opposed to mudmats;
- It is confirmed that at least three engineered crossings will be required in areas where there is or has been seabed faulting and where active drainage channels are present. Where possible, the infield flowlines and transmission facilities will be routed to avoid crossing faults and channels thereby reducing the requirement for



engineered crossings. Where engineered crossings are required this may involve subsea dredging, any dredging activities will be subject to gaining necessary approval for both the dredging process, and subsequent disposal of dredged material;

- Vessels will move at low speeds during operations, this will act to reduce the risk of collision with species that may be present in the Application Area;
- Other measures may be adopted as suitable, such as avoiding approach or sudden changes in course when within 100 m of a cetacean or sea turtle and speed restrictions for vessels on transit when a dolphins, cetacean or sea turtle is sighted within 300 m of the vessel;
- A 305 m archaeological zone is recommended for possible wreck sites and a 31-meter avoidance zone is recommended for any contacts identified during offshore works that possibly represent geohazards. In this instance, no seafloor disturbing activities will be conducted within these avoidance zones;
- Ballast water will be managed according to IMO Guidelines and will be detailed in a Ballast Water Management Plan; and
- Due to the distance from shore, Noble Energy does not expect any impacts on coastal habitats, infrastructure or resources.

5.2.4 Preservation of Fauna and Flora, including Pelagic Species

Instructions for the preservation of fauna and flora in the Application Area including the prevention of harm to habitats, to pelagic species whose presence might be increased such as sharks, marine mammals and birds. Instructions specific to the LPP are addressed in the Leviathan LLP EMMP. For Installation activities related to the Leviathan Production Development, the following instructions will be applied:

- Confirmation of the absence of hard bottom or chemosynthetic communities along the proposed pipeline corridors has been conducted during baseline survey activities;
- The risk of solid waste being lost overboard (where it could pose a risk of entanglement or ingestion by marine fauna), will be minimized through Noble Energy's WMP as required by MARPOL Annex V and Israeli Regulation;
- To the extent practicable, without compromising security, safety or work performance, lighting in open deck areas shall be oriented downward to maximize work areas and minimize excess light emissions into the environment and potential harm to birds and pelagic species, when feasible and when vessel navigational safety is not compromised;
- Support vessel operators are expected to follow all applicable maritime navigation rules and would normally follow the most direct route (weather conditions permitting) between the offshore sites and the shore base. This will reduce the chance for a vessel striking a marine mammal or sea turtle;
- Vessels will operate at low speeds to reduce the risk of collision with a marine mammal or sea turtle. Other measure that can be adopted, if practicable include changing course when within 100 m of a marine mammal or sea turtle sighting and speed can be further reduced when the vessel is within 300 m of a sighting;



- Vessel speed should be further reduced when operating in shallower water (from the LPP location towards the coastline) to reduce the potential impact on sea turtles, particularly during nesting seasons;
- Flight paths should be coordinated and planned to avoid population centers and wildlife areas including bird colonies and set minimum cruise altitudes when traversing the coast in order to minimize physical presence and noise impacts;
- Routine flights will be conducted during daytime hours only; and,
- Ballast water will be managed according to IMO Guidelines and will be detailed in a Ballast Water Management Plan.

5.2.5 Monitoring

Monitoring procedures are an integral element of Noble Energy's operations and help to ensure that the mitigation measures identified for the project are implemented. Some monitoring is prescribed in the various regulations and plans, while other monitoring is directed by Noble Energy's EHS procedures.

Noble has conducted a wide field sampling program that established the base line for water and sediment quality and in-faunal communities along the entire pipeline route and at the subsea infrastructure locations.

Noble Energy will conduct a performance assessment to confirm that a Notice to Mariners was issued and installation and support vessels were instructed to monitor and enforce the safety zone.

A number of measures will be in place to reduce the risk of oil and chemical spills specifically from production activities, which are as follows:

- The production system will be continuously monitored by a PMS and the control system will be programmed to initiate a production shutdown, or at least isolate the affected line at the wellhead, in the event of the PMS detecting a subsea line rupture;
- Monitoring of MEG pumping rates and inventory levels on the LPP to aid in the rapid detection of a substantial loss of containment in the subsea MEG system;
- Continuous monitoring of production chemical consumption rates to aid in detection of loss of containment from umbilical cores;
- Methanol is not continuously injected at the Leviathan Field. It will only be used during start-up or upset conditions and consumption will be monitored during its use to detect rapid loss of containment;
- Continuous monitoring of hydraulic fluid consumption, with any continuous use indicating a loss of containment from the hydraulic cores within the umbilical; and
- Periodical visual surveys will be conducted, using ROVs, of the production system to identify signs of infrastructure damage or leaks.

All other operational activities associated with the Leviathan Production Development, has a terminus at the LLP and therefore will be captured in the LLP EMMP.



5.2.6 Preventing or Reducing Noise Impacts

Underwater noise will be most significant during construction, installation and commissioning of the Leviathan Production Facilities, and therefore instructions highlighted in this Section focuses on these phase of the project development.

- Noise modeling has been conducted to ensure that the noise associated with the pipelay vessel is not going to be at a level that would cause harm to sensitive receptors;
- The use of a suction pile to secure the gathering manifold to the seafloor eliminates noise associated with piling;
- The DP vessel will be travelling at a relatively slow speed, particularly in the shallower water environment (from the LPP towards the coast) allowing animals time to become accustomed to vessel noise (or to move away from it) as it approaches, thereby avoiding any startle responses; and,
- Routine maintenance and monitoring of vessel/ helicopter engines and equipment in accordance with manufacturers specifications.

5.2.7 Management of Safety and Protection Zones

Instructions related to the management of Safety and Protection Zones will apply to both installation and operational phases of the Production Development and include:

- Subsea facility locations marked on charts and fisherman's plotters and proximity alarms. Consistent with international industry practice, Noble Energy will establish a 500-m radius safety zone around the pipelay vessel and the OCV while it is operating, which will be kept clear of all unauthorized vessels;
- A standby vessel will be dedicated to support the pipelay and OCV vessels in the event of an incident and it will also be used to enforce the safety zone, intervening if any vessel makes a close approach;
- Noble will initiate consultation programs at the earliest opportunity to inform fisheries and other sea users of Noble Energy's activities in the Leviathan Development area through its Public Relations, Corporate Social Responsibility and Social Performance teams in Israel;
- Prior to commencing pipelay activities, Noble Energy will consult with Haifa port authorities and provide notice to mariners to inform the authorities and public of planned vessel movements and the safety zone around the pipelay vessel. All vessel operators must follow applicable maritime navigation rules;
- Maritime standards and procedures, including radar / watch and lighting configurations will be followed;
- Good seamanship, professional knowledge and judgement will be ensured by using fully trained competent staff; and,
- Selection of supply / standby vessels that comply with IMO / Israeli coastguard codes for prevention of oil pollution.



5.2.8 Emergency Procedures

Instructions related to the Emergency Procedures will apply to both installation and operational phases of the Production Development and include:

- A dropped object study will be performed during subsequent design phases to assess the requirement for pipelines/ jumper protection around the LPP to minimize the potential for a subsea loss of containment to occur as a result of dropped object impact;
- Safety zones will be applied to facilities and activities as described above in Section 5.2.7, and details will be communicated to vessel operators through the routine channels of the appropriate maritime authorities;
- Noble Energy requires construction, execution and commissioning contractors to have Emergency Response Plans to deal specifically with the actions to be taken in the event of emergencies;
- Noble Energy and the drilling rig contractor will coordinate their incident management processes in the event of an emergency that requires emergency response coordination via incident management teams;
- Emergency response capabilities of equipment and personnel shall be tested through regular drills and exercises and drills to familiarize personnel with the emergency response procedures;
- Equipment stockpiles onshore and aboard supply vessels shall be checked routinely;
- The pipelay vessel will have appropriate marking and lighting and will broadcast navigation status information on AIS;
- Where practicable vessels will have double hull and integrity management systems;
- All vessels in use will comply with IMO codes for prevention of oil pollution and all vessels will have on board Shipboard Pollution Prevention Emergency Plans (SOPEPs);
- All accidental spills shall be reported to the relevant authorities;
- In the unlikely event of a substantial gas release, nearby vessels will be informed of its location;
- Regular maintenance and inspection of equipment and high risk spill points (in particular bunkering hoses, bunds, storage tank valves etc.);
- Lube and hydraulic oil stored on board the LPP or vessels will be stored in tanks or sealed drums which pose a minimal risk of spillage. In addition drums and storage tanks for hydrocarbons will be well secured and stored in bunded areas; and
- Absorbent material will be available on board vessels to clean up any deck spills or leaks, and suitable storage and disposal procedures will be in place for waste oil and documented maintenance of bilge systems.

A number of measures will be in place to reduce the risk of oil and chemical spills specifically from construction/ installation and supply vessels:



- During construction and installation there will be a safety exclusion zone (500 m) around the pipelay vessel when working;
- Details of the pipelay operation and exclusion zones will be communicated to vessel operators through the routine channels of the appropriate maritime authorities;
- The pipelay vessel will have appropriate marking and lighting and will broadcast navigation status information on AIS;
- Pipelines will adhere to international design standards and an asset integrity management program shall be implemented in accordance with Noble Energy's Global Integrity Management Program;
- All vessels in use will comply with IMO codes for prevention of oil pollution and all vessels will have onboard SOPEPs;
- Approach procedures and extreme weather operational restrictions shall apply. For example, if wave heights are considered too extreme for safe passage of the vessel and visibility is poor due to bad weather conditions then the construction and installation vessels will not execute activities. Exact measurements of acceptable weather conditions and sea state will be formerly agreed prior to any construction activities and documented within a Leviathan Development Project dedicated Construction Management Plan. All vessel operators will be familiar with the plan and shall have it available onboard each construction vessel in order for all employees to refer to it as and when necessary. Regular communication will also be maintained with Haifa Port Authorities to monitor weather conditions.
- A pre-mobilization audit of vessels including a detailed list of contract requirements (as part of bridging documents) in terms of oil and chemical prevention procedures must be in place. Details of this will also be included in a dedicated Construction Management Plan;
- Environmental awareness training of vessel crews including spill prevention and familiarization with Oil Spill Contingency Plans (OSCP);
- OSCP will include response procedures to all the credible spill scenarios that have been modelled for the purposes of this Production Development EIA for activities that are conducted from the LPP location to the territorial water boundary.

Noble Energy's OSCP shall outline Tier II and III equipment and resource requirements. Noble Energy will maintain appropriate oil spill response and clean-up equipment and supplies to efficiently address spill incidents; and

- Regular maintenance and inspection of equipment and high risk spill points (in particular bunkering hoses, bunds, storage tank valves, etc.) will be undertaken;
- Offshore chemical use and storage will be according to MARPOL Convention Annex II requirements; and
- Absorbent material will be available onboard all vessels to clean-up any deck spills or leaks, with suitable storage and disposal procedures for waste oil.

Procedures will be put in place for bunker transfer and other bulk storage transfers to minimise the risk of a spillage;



- Lube and hydraulic oil to be stored onboard the LPP or vessels will be stored in tanks or sealed drums which pose a minimal risk of spillage. In addition, drums and storage tanks for hydrocarbons will be well secured and stored in bunded areas;
- Documented records for inspection of all hydraulic and hydrocarbon transfer hoses;
- Procedures will be in place for bunker transfer and other bulk storage transfers to minimize the risk of a spillage; and
- Operational procedures on board vessels including use of drip trays under valves, use of pumps to decant lubricating oils, use of lockable valves on storage tanks and drums.

In the event that there is a loss of containment from a Noble asset, Noble has an Oil Spill Response Strategy (refer to Emergency Factory Plan, No. 145-13-EHSR-EPP-PA-T3) in place which provides a system of preparedness and tactics for responding to an oil pollution incident in the Mediterranean Sea. Noble has carried out work to identify possible scenarios that could occur, and made preparations for the different types of events.

Noble maintains an Emergency Command Post in Israel where appropriate resources are stationed for coordinating and managing emergency response operations. Noble also maintains equipment contracts with NRC, OSRL and MPS.

A number of steps are to be implemented upon discovery of oil pollution. These steps require that:

- Upon discovery; initial evaluation of the situation, shut-down of the source if possible and immediate notification to supervisory staff;
- Evaluation of incident magnitude by the IMT;
- Contacting of appropriate governmental organisations and industrial facilities to coordinate response efforts and information sharing; and
- Enacting appropriate response actions based on the Tier Level ranking of the incident.

Noble has every intention for an incident to be responded to within four (4) hours following identification of an incident. The procedures that Noble intends to enact for dealing with oil pollution at sea during an event (in order of preference) include:

- Sheen-busting;
- Dispersant application;
- Shoreline protection (booming);
- Mechanical recovery (skimming); and
- Shoreline clean-up/environmental recovery.

Additionally, Noble has plans in place to deal with the collection, temporary storage, and final recycling or destruction of any recovered hydrocarbons that have resulted from a loss of containment.



To ensure geological and seismic risks to the subsea production system are managed the following engineering guidelines/standards will be applied during detailed design of the pipelines:

International Organization for Standards (ISO) 19901-2 shall be applied for the following purposes:

- Estimating seismic load on the pipeline system outside of Israeli territorial waters;
- Estimating seismic load on foundations associated with the pipeline system outside of territorial waters;
- Estimating seismic loads on pressurized components of PLETs and In Line Structures (ILS) outside of territorial waters; and,
- Estimating seismic loads on foundations of equipment located within Israeli territorial waters.

DNV standard DNV-OS-F101 shall be applied in order to estimate the seismic response of the pipeline system outside of territorial waters when subject to seismic loads as determined from ISO 19901-2. Guidelines from the PRCI and the MCEER will be used as appropriate;

DNV-OS-C101 shall be applied to determine limit states for foundation design associated with infrastructure that is located outside of Israeli territorial waters;

ISO 19901-4 shall be applied to determine the seismic design criteria for foundations associated with infrastructure that is located outside of Israeli territorial waters;

ASME standard ASME B31.8 will be applied to determine the seismic design criteria for PLETs and ILS associated with the pipeline infrastructure outside of territorial waters;

SI 413 will be used, in conjunction with the ASCE standards ACSE 7-05 and ASCE 7-10, to estimate seismic loads for the pipeline system within Israeli territorial waters; and,

NEN standard NEN-EN 1594 shall be applied, in conjunction with PRCI/MCEER guidelines to determine seismic design criteria for equipment foundations within Israeli territorial waters.

Emergency response in the case of fire shall be accounted for in the Leviathan Development Project dedicated Construction Management Plan and Operational Management Plan which shall be based on safety studies that will be conducted during the next phase of Project design.

Based on reservoir characteristics it is not expected that H₂S will be detected during production operations.

5.2.9 Geological and Seismic Risks

Noble Energy has considered seismic risk (including potential earthquakes) when developing the proposed pipelay and subsea infrastructure program. The design and engineering of the pipelines and associated subsea infrastructure will take into account any identified seismic risk as well as seafloor and shallow geo-hazards.



5.2.10 Protection and Maintenance of Transmission / Supply Pipelines

During construction and installation there will be a safety exclusion zone (500 m) around the pipelay vessel when working;

Details of the pipelay operation and exclusion zones will be communicated to vessel operators through the routine channels of the appropriate maritime authorities;

Pipelines will adhere to international design standards and an asset integrity management program shall be implemented in accordance with Noble Energy's Global Integrity Management Program;

The production system will be continuously monitored by a PMS and the control system will be programmed to initiate a production shutdown, or at least isolate the affected line at the wellhead, in the event of the PMS detecting a subsea line rupture;

Continuous monitoring of MEG pumping rates and inventory levels on the LPP to aid in the rapid detection of a substantial loss of containment in the subsea MEG system;

Continuous monitoring of production chemical consumption rates to aid in detection of loss of containment from umbilical cores;

Continuous monitoring of hydraulic fluid consumption, with any continuous use indicating a loss of containment from the hydraulic cores within the umbilical; and

Annual visual surveys will be conducted, using ROVs, of the production system to identify signs of infrastructure damage or leaks.

Pipeline Stability

The Leviathan pipelines will be designed to satisfy the on-bottom stability requirements of DNV OS F101 offshore standards for submarine pipelines. The lateral stability analysis will be conducted using the AGA/PRCI Level 2 Pipeline On-Bottom Stability Analysis Software which is permitted by the code in lieu of utilizing DNV RPF109. The software determines the pipe response when subjected to user specified waves and current and performs an absolute static stability calculation. Extreme wave and extreme current conditions will be considered in the analysis, with 100-yr storm return periods used for the operation condition and 10-yr storm return periods used for the installation condition. All of the Leviathan infield, gathering and MEG pipelines will be designed to satisfy the AGA/PRCI stability criteria with a minimum safety factor of 1.1. Pipeline vertical stability will meet the requirement to have a specific gravity sufficient to avoid floatation by a minimum safety factor of 1.1, for the dry bore condition, in accordance with DNV RP F109.

Post installation, monitoring of strains developing on subsea pipelines may also be considered for areas of concern which have been identified in the modelling.

5.2.11 Decommissioning

A Decommissioning Plan will address any mitigation measures to minimize environmental impacts.

Decommissioning will be conducted according to national regulations and guidelines including MEWR Guidance for Decommissioning Activities.



5.2.12 Periodical Reporting and Incident Reporting

Periodical reporting shall be done according to the specific requirements laid out in the relevant discharge permit; and

Incident notification shall be done according to Noble Energy's incident notification procedure.

5.2.13 Changes in Development Plan

Noble Energy will report any changes in the Construction, Execution and Production plan, including the impact of such changes on the environment.

5.2.14 Implementation of SEMS

Specific to Israel, Noble Energy is implementing a Safety and Environmental Management System (SEMS) that builds upon the elements that make up its GMS system (refer to Section 5.1.1). The SEMS provides the framework to make offshore gas development safe for workers and protective of the environment.

The SEMS is implemented across Noble Energy's offshore operations and is applied to third-party contractors involved in other support activities. This ensures that all levels of operations are performed in a consistent manner and that safety and environmental protection are consistently achieved. The integration between the Noble Energy SEMS and contractor operations is implemented through interface documents that identify common processes and approaches to address any differences in procedures between Noble Energy and the contractor as well as any site-specific hazards of the Leviathan Field Development Project. Noble Energy will conduct an extensive comparison and review of vessel plans, processes and procedures relative to the Noble Energy SEMS to ensure that the contractor's plans are acceptable for use as the primary system during the Leviathan Field Development Project.